

PROTOCOL

Human Health Constituents of Potential Concern

Introduction

The following protocol has been developed in order to support the Savannah River Site environmental remediation program. This protocol provides instructions for the development of a list of human health constituents of potential concern (HH COPCs). The protocol instructions are based on the latest available EPA guidance as well as on input from the staff of EPA and SCDHEC.

The exposure groups for human health risk analysis are described in the Exposure Group Protocol. The process described below is intended to be applied after application of the Data Processing Protocols to the analytical data.

This protocol is to be applied to all constituents (including radionuclides) except for the following constituents: calcium, chloride, iodine, magnesium, phosphorous, potassium, sodium. These constituents are excluded because they are essential nutrients that are not considered toxic and do not have health based limits.

Details

DATA PREPARATION

1. Data for each constituent should be sorted by medium as described in the Exposure Group Protocol. For any data which have qualifiers, determine if the qualified data should be retained. Do not eliminate data based on "J" qualifiers.

RBC / RBA COMPARISON

2. For carcinogenic effects, compare the maximum concentration of each constituent in each exposure group to the 1×10^{-6} residential risk based concentration (RBC) or risk based activity (RBA) levels. The RBCs and RBAs are calculated using EPA slope factors for carcinogens and

radionuclides. Use the residential RBCs for soils and the tap water values for groundwater and surface water.

Retain the constituent for further analysis if its value exceeds the carcinogenic screening value. Drop the constituent if its value is less than the carcinogenic screening value.

3. For non-carcinogenic effects, compare the unit maximum concentration of each constituent in each exposure group to the hazard quotient (HQ) level of 0.1. Retain the constituent for further analysis if its maximum value exceeds the non-carcinogenic screening value. Drop the constituent if its maximum value is less than the non-carcinogenic screening value.
4. If RBC and RBA values are not available, then determine if a surrogate value can be used. If no surrogate values can be determined, identify the constituent in the uncertainty discussion as one for which a risk evaluation could not be performed and discuss the potential risks qualitatively. Carry the constituent forward to the human health constituent of concern (HHCOC) list.
5. Determine if the constituent is naturally occurring or anthropogenic. Anthropogenic constituents that exceed the RBC/RBA screen will be carried forward through a more detailed analysis of human health risk. In addition, an administrative path forward will be discussed in the summary and conclusion section(s) of the RFI/RI/BRA for those anthropogenic constituents that exceed the risk criteria but were determined to be from some other man-made source than the operable unit.

BACKGROUND COMPARISON

6. For naturally occurring inorganics and radionuclide constituents, compare the maximum concentration to two times the unit-background average concentration for each exposure group.

For soils, the 0-1 foot (ft) unit maximum value is compared to two-times the 0-1 ft unit-background average value. If a subsurface soil (0-4 ft) exposure group is evaluated, the 0-4 ft unit maximum value is compared to two times the pooled average unit-background value for all soil depths.

For groundwater, compare the maximum concentration in each distinct aquifer to two times the unit-background average values for the same aquifer.

Retain the constituent for further analysis if its maximum value exceeds the unit-background test value. Drop the constituent if its maximum value is less than the unit-background test value.

ADDITIONAL BACKGROUND COMPARISON FOR NATURALLY OCCURRING CONSTITUENTS

The additional screening step (Step 7) comparing naturally occurring constituents to SRS-background is dependent on regulatory approval of the DOE Preliminary Background Soils Study Report or regulatory approval of the use of other background data or statistical comparisons as appropriate.

7. For constituents designated as "naturally occurring", compare the maximum concentration detected to two times the average SRS-background concentration for each exposure group. If SRS-background is not an appropriate comparison, then other background comparisons can be used, such as regional background, statistical comparisons, or others as appropriate, if agreed to in advance with the regulators.

Retain the constituent for further analysis if its maximum value exceeds the SRS-background test. Drop the constituent if its maximum value is less than the SRS-background test value.

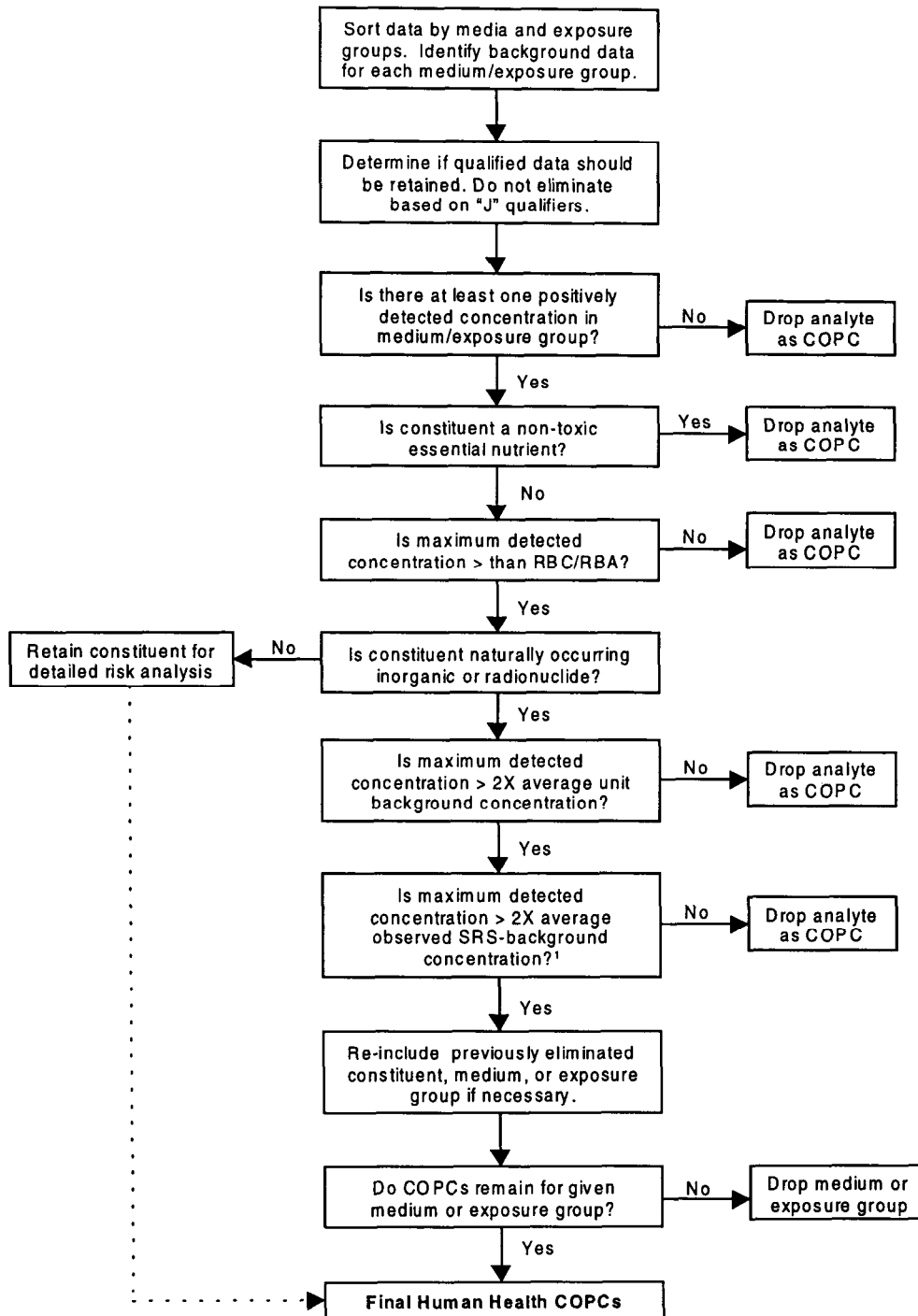
RE-INCLUSION STEP

8. Consider whether any previously eliminated constituent, medium, or exposure group should be re-included due to historical information or other considerations including mobility, bioaccumulation, persistence, and toxicity. Also, any member of a chemical class that has other members selected as COPCs should be retained (e.g., detected PAHs, dioxides, and furans).

FINAL HH COPC IDENTIFICATION

9. The constituents retained to this point in the process are identified as HH COPCs. They will be carried forward through a more detailed analysis of human health risk. If no HH COPCs have been identified at this point, then this part of the analysis is complete.

Figure 1. Flowchart of Human Health COPC Selection Process



¹ Additional screening step for naturally occurring constituents is dependent on regulatory approval of the DOE Preliminary Background Soils Study Report. Additional background criteria may be used upon regulatory approval.